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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/671,490	09/29/2003	Kwang Hyo Chung	123034-05004739	8465

22429 7590 12/11/2007  
LOWE HAUPTMAN HAM & BERNER, LLP  
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ALEXANDRIA, VA 22314

EXAMINER
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NAGPAUL, JYOTI

ART UNIT	PAPER NUMBER
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1797

MAIL DATE	DELIVERY MODE
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12/11/2007

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

**Office Action Summary**

Application No.

10/671,490

Applicant(s)

CHUNG ET AL.

Examiner

Jyoti Nagpaul

Art Unit

1743

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 20 September 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-16 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

### DETAILED ACTION

Amendment filed on September 20, 2007 has been acknowledged. Claims 1-16 are pending.

#### ***Response to Amendment***

Rejection of Claims 1-16 as being anticipated by Kellogg (US 2001/0001060) has been withdrawn in light of applicant's remarks and amendments.

#### ***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

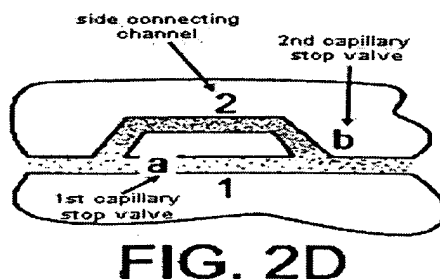
1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was

not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. **Claims 1-16** are rejected under 35 U.S.C. 103(a) as being unpatentable over McNeely (US 6591852).

5. McNeely discloses methods and apparatus for controlling fluid flow through microchannels. The apparatus comprises at least one side connecting channel (2) connecting a first capillary stop valve (a) to a second stop valve (b). The capillary stop valves (a and b) stop the flow of the fluid using the surface tension of the fluid. (See Example 1) Additionally, the flow of fluid through the side connecting channel (2) opens the capillary stop valves (a and b). (See Figure below) The apparatus further comprises at least one flow delay part, surface modification and/or channel geometry, is formed within the side connecting channel (2). (See Col. 5, Lines 50-59) (See Col. 7, Lines 33-46) McNeely further teaches the side connecting channel adjust the surface tension by at least one of increasing a width of the path, decreasing a width of the path and performing surface modification or temperature change so that the fluid reliably moves. (See Col. 7, Lines 31-46)



McNeely fails to explicitly teach the first and second stop valves as disclosed above in a microchannel arrangement comprising at least one storage chamber, at least one reaction chamber and at least one exhaust chamber. McNeely further fails to explicitly disclose the first capillary stop valve (a) is located between the at least one storage chamber and the at least one reaction chamber. McNeely further fails to teach the second capillary stop valve (b) is between the at least one reaction chamber and the at least one exhaust chamber.

However, McNeely does disclose the mixing fluids using the above embodiment in more complex models in which more channels or wells are involved can be utilized for controlling the fluid flow of more than one fluid through the channel and increasing gradual and uniform mixing of the fluids. (See Col. 7, Lines 48-53 and Col. 11-12, Lines 40-8) Additionally, Figures 10A-10C describe a microchannel model comprising a storage chamber to which a fluid is injected and stored, at least one reaction chamber in which a predetermined reaction occurs on the fluid, at least one supply channel communicating fluid from each storage chamber to the at least one reaction chamber and at least one exhaust chamber in which fluid used as a result of the reaction is exhausted. (See for example figure 10B below) McNeely further teaches at least one storage chamber includes a fluid inlet operable to receive fluid.

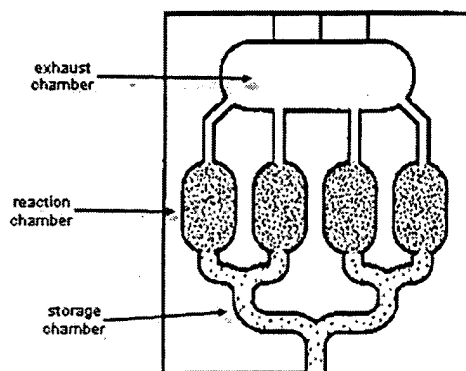


FIG. 10B

Therefore, the disclosure of McNeely suggests that it would have been obvious to one of ordinary skill in the art to combine the different embodiments disclosed above by McNeely to produce the desired microchannel device to evenly distribute fluid across all the channels.

#### ***Response to Arguments***

6. Applicant's arguments with respect to claims 1-16 have been considered but are moot in view of the new ground(s) of rejection. Refer above.

#### ***Conclusion***

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not


mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jyoti Nagpaul whose telephone number is 571-272-1273. The examiner can normally be reached on Monday thru Friday (8:00-4:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jill Warden can be reached on 571-272-1267. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JN

  
Jill Warden  
Supervisory Patent Examiner  
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